HP NC7771 PCI-X Gigabit Server Adapter User Guide

June 2007 (Fourth Edition)
Part Number 252458-00D

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About This Guide

Use this guide for reference when installing HP NC7771 PCI-X Gigabit Server Adapters.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

Technician Notes

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Disconnect power from the system by unplugging all power cords from the power supplies.**
- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

HP updates networking software frequently to include new functionality and features. Complete the following steps to get the latest drivers, firmware, and documentation.

1. Go to the HP website (http://www.hp.com).
2. Click **Support and Troubleshooting Information** from the left menu bar.
3. Type the product name in the **for product** box and press **Enter**. For example, type NC370T.
4. Download the drivers, firmware, or documentation as needed.

Telephone Numbers

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For HP technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to

  www.hp.com

1

Introduction

Overview

The HP NC7771 PCI-X Gigabit Server Adapter is a high-performance, single port, Ethernet adapter that delivers up to 1000 Mb/s Ethernet over twisted-pair (copper) cabling. The NC7771 adapter has a fully integrated controller capable of auto-negotiating a link at 10, 100, or 1000 Mb/s. The network connection is made through an RJ-45 connector. LED indicators show the speed and activity of the link once it has been established. The NC7771 PCI-X Gigabit Server Adapter is a supported option for selected HP ProLiant servers. For best performance, install the adapter in a 64-bit/133 MHz, PCI-X slot.

For the latest functionality, features, and operating system support for this server adapter, refer to the networking page at

(http://h18004.www1.hp.com/products/servers/networking/index-nic.html)

Hardware Overview

The NC7771 Gigabit Server Adapter has one auto-negotiating 10/100/1000 RJ-45 port. LED indicators show link, activity, and port speed. Refer to Table 1-1 for descriptions of LED operations.

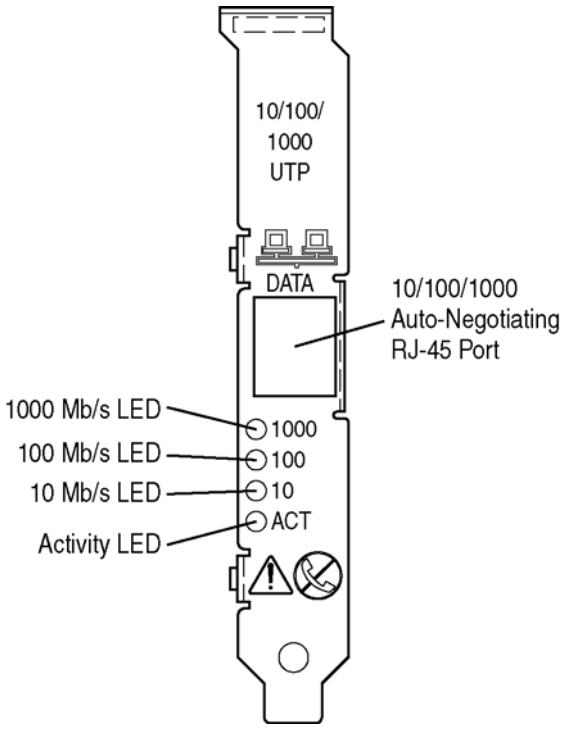

Figure 1-1: RJ-45 port and LED locations

LED Indicators

The following table describes the LED indicators located on the front panel of the HP NC7771 Gigabit Server Adapter.

Table 1-1: 10/100/1000 LED Operations for the NC7771 Server Adapter

LED	Display	Description
1000	On	Link to the network is established at 1000 Mb/s.
	Off	No 1000 Mb/s link is available.
100	On	Link to the network is established at 100 Mb/s.
	Off	No 100 Mb/s link is available..
10	On	Link to the network is established at 10 Mb/s.
	Off	No 10 Mb/s link is available.
ACT	On	The adapter is sending or receiving network data at 10, 100, or 1000 Mb/s, as indicated by the 10, 100, and 1000 LEDs.
	Off	No network data is being sent or received.

Unshielded Twisted Pair Category 5 Cable

The NC7771 Gigabit Server Adapter can use existing Category 5 Unshielded Twisted Pair (UTP) (or better) cable to deliver Gigabit Ethernet over copper, according to the IEEE 802.3ab specifications. For new installations, Category 5e cable is recommended. For troubleshooting and other information about cabling, refer to “UTP Cable Specifications” in Appendix C.

2

Installing the Adapter

Overview

This chapter describes installation precautions and explains how to install the adapter. It also describes how to connect the network cable.

WARNING: To avoid the risk of personal injury or damage to the equipment, consult the safety information and user documentation provided with the equipment before attempting installation of the adapter.

Many servers are capable of producing energy levels that are considered hazardous. Users should not remove enclosures, nor should they bypass the interlocks provided for removal of these hazardous conditions.

Installation of this adapter should be performed by individuals who are both qualified in the servicing of computer equipment, and trained in the hazards associated with products capable of producing hazardous energy levels.

NOTE: Before removing the cover of the server, refer to the HP documentation for the proper methods for installing a PCI card and avoiding electric shock hazards.

Electrostatic Discharge Precautions

A discharge of static electricity from a finger or other conductor can damage components on the adapter. This can make the adapter inoperable. In addition to the following information, refer to Appendix B for more precautions.

To prevent electrostatic damage, observe the following precautions:

- Always properly ground yourself when touching a static-sensitive component or assembly.
- Avoid hand contact by transporting and storing parts in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free locations.
- Place containers on a grounded surface before removing the contents.
- Avoid touching pins, leads, or circuitry.

Installing the Adapter in a Server

Refer to the HP ProLiant server documentation for additional information on how to safely install a PCI card in the server.

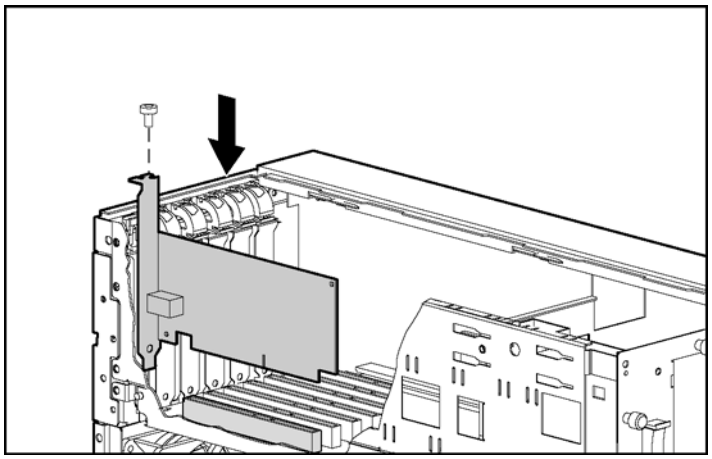

Figure 2-1: Installing the adapter in a server

CAUTION: If the server is not PCI Hot Plug compliant, power it down and unplug the power cord from the power outlet before removing the server cover. Failure to do so may damage the adapter or server.

1. Remove the server cover and cover bracket from a PCI slot.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

2. Firmly seat the adapter in the PCI slot and secure the adapter bracket.
3. Replace the server cover and plug in the power cord.

Connecting the Network Cable

Network connections for the NC7771 Server Adapter can employ existing Category 5 UTP (or better) cable for Gigabit over copper transmissions. For new installations, Category 5e (enhanced Category 5) or better cable is recommended.

To secure the cable, plug the cable connector into the RJ-45 port. Ensure that the tab on the plug clicks into position, indicating that it is properly seated.

For more information, refer to “UTP Cable Specifications” in Appendix C.

A

Regulatory Compliance Notices

Federal Communications Commissions Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Declaration of Conformity for Products Marked with the FCC Logo - United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

Or, call

1-800- 652-6672

For continuous quality improvement, calls may be recorded or monitored.

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

Or, call

(281) 514-3333

To identify this product, refer to the Part, Series, or Model number found on the product.

Canadian Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Avis Canadien

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

CE

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community. Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22)—Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11)—Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2)—Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3)—Power Line Flicker
- EN 60950 (IEC 60950)—Product Safety

Japanese Notice

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取扱説明書に従って正しい取り扱いをして下さい。

Korean Notice

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

제조자/인증받은자 : 브로드콤
코오퍼레이션

B

Electrostatic Discharge

Overview

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place containers on a grounded surface before removing the contents.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP authorized reseller install the part.

NOTE: For more information on static electricity or assistance with product installation, contact your HP authorized reseller.

C

Specifications

NC7771 PCI-X Gigabit Server Adapter Specifications

Table C-1: NC7771 PCI-X Gigabit Server Adapter Specifications

Specification	Description
Network Controller Chipset	Broadcom® 5703CKHB
Bus Type	PCI-X or PCI
Bus Width	32 or 64 bits
Bus Speed	33, 66, 100, or 133 MHz
Data Transfer Method	Bus Master DMA
Power Requirement	Operating Voltage: +5V +/- 5% Power Consumption: 5 Watts Maximum: 1.0 A @ 5V(DC)
Standards Supported	IEEE 802.1Q, 802.3ab, 802.3u, 802.3x, 802.3
Dimensions	6.6 x 2.5 inches (L x W), 16.8 cm x 6.4 cm
Connector and Distances	One RJ-45 Connector, Cable and lengths as follows: 10BASE-T: Category 3, 4, or 5 UTP 100 Meters (328 feet) 100BASE-TX: Category 5 UTP 100 Meters (328 feet) 1000BASE-TX: Category 5 UTP 100 Meters (328 feet)
Interrupts Supported	Automatically configured
Temperature Range	Operating: 0°C to 55°C / 32°F to 131°F Storage: -40°C to 65°C / -40°F to 149°F
Relative Humidity	5% to 95%, non-condensing

continued

Table C-1: NC7771 PCI-X Gigabit Server Adapter Specifications *continued*

Specification	Description	
Emissions Classifications	Class B	
Agency Approvals	USA:	FCC (CFR 47 part 15) and UL 60950
	Canada:	ICES-003 and CSA 60950
	Japan:	VCCI
	Korea:	MIC (RRL), EMC Registration
	Australia:	ACA, AS/NZS3548/EN55022:1998 (CISPR 22), EN55024:1998
	European Union:	EN 55022:1998 (CISPR 22), EN 55024:1998, and IEC 60950:1999 (EN 60950:2000)
Safety Compliance	UL Mark (USA and Canada)	
	CE Mark	
	EN 60590	

UTP Cable Specifications

To connect to the network, the NC7771 Server Adapter uses the following cable for 1000BASE-T transmission.

- Category 5 UTP or better
- 22-26 AWG, 100Ω @ 1MHz
- EIA/TIA 568a or EIA/TIA 568b

Using UTP Category 5 Cable in Gigabit over Copper Installations

For Gigabit over copper installations, Category 5 UTP or better 1000BASE-T cable must comply with the IEEE 802.3ab 1000BASE-T standard. For new installations, Category 5e (enhanced Category 5) or better cable is recommended.

RJ-45 Pinouts and Crossover Function

The Ethernet standard also specifies that each segment implement a crossover function to connect the transmitter of one device to the receiver of a device at the other end, and vice-versa. The crossover function may be implemented internally at the hub or switch, or externally through the twisted-pair media.

10/100 Straight-Through Pinouts

If the crossover function is implemented internally, the port is labeled MDI-X (Medium Dependent Interface-Crossover). When an MDI-X port is connected to an MDI port, the twisted pair media should be wired straight-through using the physical pinouts indicated in Table C-2.

Table C-2: 10/100 Pinouts Using Internal, Straight-Through Crossover

Pin	Function	Color Match	Function	Pin
1	TD+	White/Orange	TD+	1
2	TD-	Orange/White	TD-	2
3	RD+	White/Green	RD+	3
4		Blue/White		4
5		White/Blue		5
6	RD-	Green/White	RD-	6
7		White/Brown		7
8		Brown/White		8

Figure C-1 shows the straight-through 10/100 connector wiring to be used when the crossover function is implemented on the hub or switch.

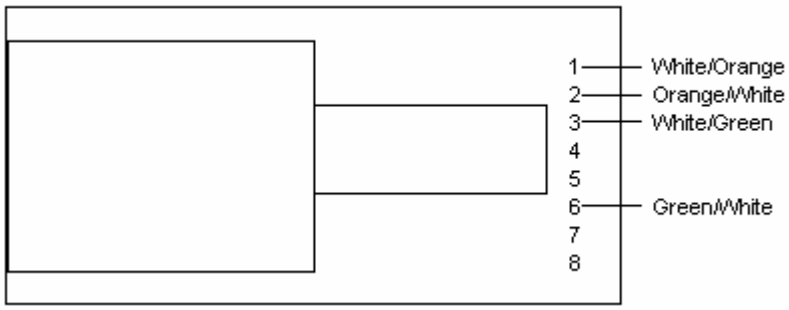

Figure C-1: 10/100 straight-through wiring for RJ-45 connector

10/100 Crossover Pinouts

When the crossover function is not provided within the hub or switch, you must implement the crossover through the twisted-pair media using the physical pinouts indicated in Table C-3.

Table C-3: 10/100 Pinouts Using External Crossover

Pin	Function	Color/Match	Function	Pin
1	TD+	White/Orange	RD+	3
2	TD-	Orange/White	RD-	6
3	RD+	White/Green	TD+	1
4		Blue/White		
5		White/Blue		
6	RD-	Green/White	TD-	2
7		White/Brown		
8		Brown/White		

Figure C-2 shows the correct wiring to use when the crossover function is implemented externally in the twisted-pair cabling.

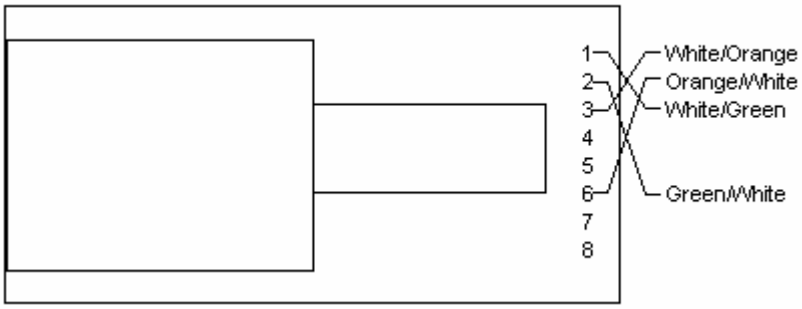

Figure C-2: 10/100 external crossover for RJ-45 connector

Gigabit over Copper Internal Straight-Through Pinouts

Unlike connections in which the crossover function is implemented internally at the hub or switch, the NC7771 Server Adapter provides its own automatic crossover function. This means you can wire twisted-pair media straight-through for adapter-to-hub, adapter-to-switch, or adapter-to-adapter connections using the pinouts shown in Table C-4.

NOTE: To operate at Gigabit speeds, all four pairs of wires must be terminated within the RJ-45 connector.

Table C-4: Gigabit over Copper Pinouts Using Internal Crossover

Pin	Function	Color Match	Function	Pin
1	BI_DA+	White/Orange	BI_DA+	1
2	BI_DA-	Orange/White	BI_DA-	2
3	BI_DB+	White/Green	BI_DB+	3
4	BI_DC+	Blue/White	BI_DC+	4
5	BI_DC-	White/Blue	BI_DC-	5
6	BI_DB-	Green/White	BI_DB-	6
7	BI_DD+	White/Brown	BI_DD+	7
8	BI_DD-	Brown/White	BI_DD-	8

Figure C-3 shows straight-through Gigabit over copper connector wiring to be used when the crossover function is implemented within the hub or switch.

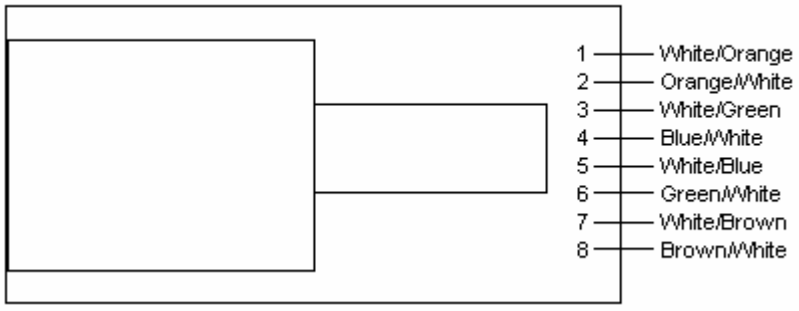

Figure C-3: Gigabit straight-through wiring for RJ-45 connector

Gigabit over Copper External Crossover Pinouts

When a crossover function is not provided by the adapter, hub or switch, you must implement it through the twisted-pair media using the physical pinouts shown in Table C-5.

Table C-5: Gigabit over Copper Crossover Pinouts

Pin	Function	Color Match	Function	Pin
1	BI_DA+	White/Orange	BI_DB+	3
2	BI_DA-	Orange/White	BI_DB-	6
3	BI_DB+	White/Green	BI_DA+	1
4	BI_DC+	Blue/White	BI_DD+	7
5	BI_DC-	White/Blue	BI_DD-	8
6	BI_DB-	Green/White	BI_DA-	2
7	BI_DD+	White/Brown	BI_DC+	4
8	BI_DD-	Brown/White	BI_DC-	5

Figure C-4 shows the correct Gigabit over copper wiring to be used when the crossover function is implemented externally in the twisted-pair cabling.

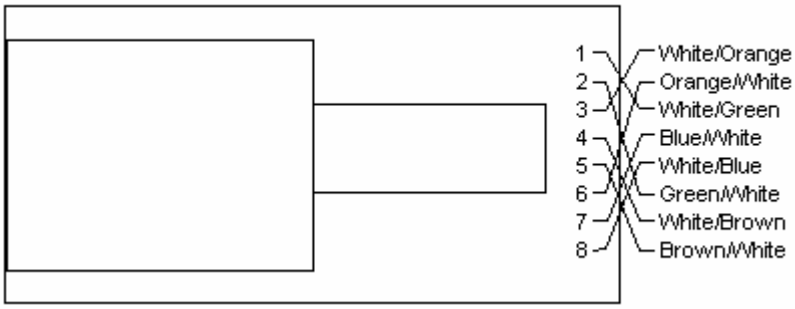

Figure C-4: Gigabit over copper external crossover for RJ-45 connector